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IS 1448-68 (1967): Methods of Test for Petroleum and its Products, Part 68: Evaporation Loss in Greases (22-hour Drying) [PCD 1: Methods of Measurement and Test for Petroleum, Petroleum Products and Lubricants]

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"Knowledge is such a treasure which cannot be stolen"

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IS : 1448 [P : 68] - 1967
(Reaffirmed 1990)
REAFFIRMED
2003

Indian Standard
METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS
[P : 68]
EVAPORATION LOSS IN GREASES (22-HOUR DRYING)

(Third Reprint JULY 1992)

UDC 665·765 : 543·82

Adapted, with permission, from the Institute of Petroleum Standard No. IP 183/63T

1. SCOPE

1.1 This method describes test procedure for the determination of evaporation loss of lubricating greases under prescribed conditions.

2. OUTLINE OF THE METHOD

2.1 The sample of grease in an evaporation cell is placed in a bath maintained at the desired test temperature which is normally in the range of 99° to 150°C. Heated air is passed over its surface for 22 hours. Evaporation loss is calculated from the loss in weight of the sample.

3. APPARATUS

3.1 The assembly of apparatus, as shown in Fig. 1, consists of the following major parts.

3.1.1 *Evaporation Cell* — conforming to the form and dimensions shown in Fig. 1 and with the following details with all joints hard-soldered.

a) *Body and Cover* — constructed of stainless steel, the air-heating coil being of tinned copper tubing;

b) *Sample Cup* — as shown in Fig. 2. It is recommended that the weight shall not exceed 200 g. The cup, hood, outlet tube and orifice shall be constructed of 18 percent chromium and 8 percent nickel alloy steel. The sample cup shall be screwed to the hood and the latter screwed to the outlet tube of the cover.

c) The cover and cell shall make an air-tight joint.

3.1.2 *Air Supply System* — capable of supplying to the cell the required flow of air free of entrained particles. A 400-mm length of 25 mm diameter pipe packed with glass wool has been found satisfactory for filtering the air.

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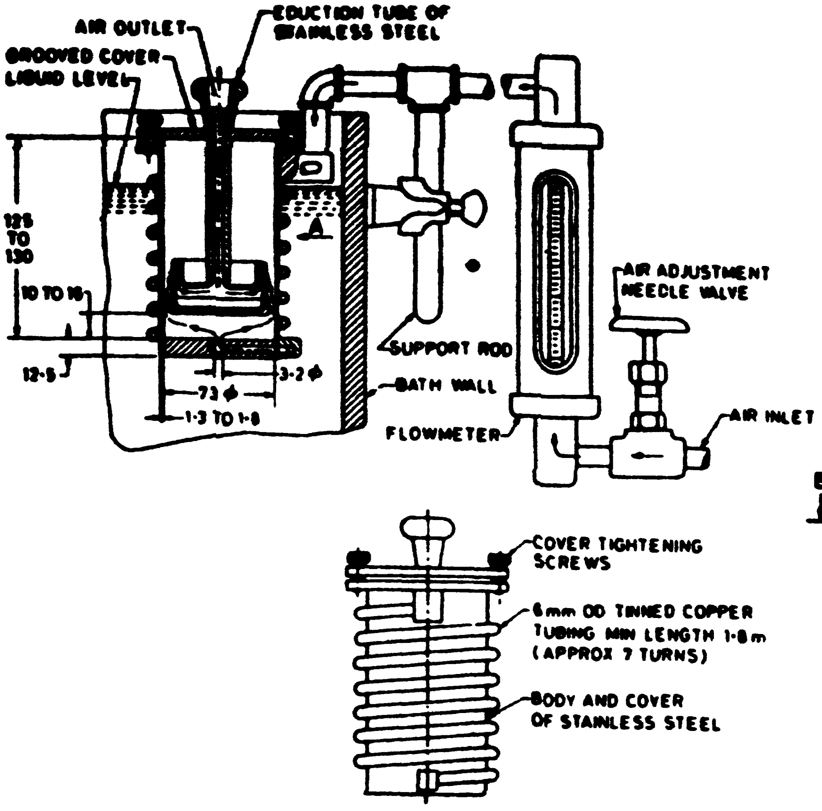
Gr 1

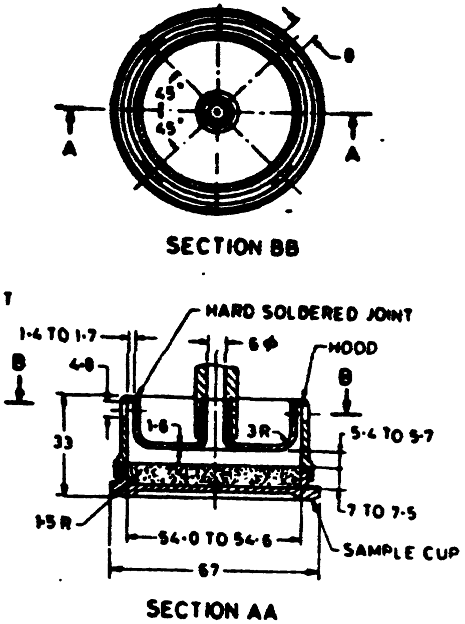
June 1967


AIR OUTLET
EDUCTION TUBE OF STAINLESS STEEL
GROOVED COVER
LIQUID LEVEL
125 TO 130
10 TO 16
12·5
73 ϕ
3·2 ϕ
1·3 TO 1·8
A
SUPPORT ROD
BATH WALL
FLOWMETER
AIR ADJUSTMENT NEEDLE VALVE
AIR INLET
COVER TIGHTENING SCREWS
6 mm OD TINNED COPPER TUBING MIN LENGTH 1·8 m (APPROX 7 TURNS)
BODY AND COVER OF STAINLESS STEEL

VIEW IN DIRECTION OF ARROW A

All dimensions in millimetres.

Fig. 1 Apparatus for Evaporation Loss



All dimensions in millimetres.

Fig. 2 Grease Sample Cup

3.1.3 *Oil Bath* — of sufficient depth to allow immersion of the evaporation cell to the proper level indicated in Fig. 1 and capable of being controlled to within ±0·5°C of the desired temperature and with a maximum variation, throughout the bath, of 0·5°C. Circulation of the oil-heating medium by a pump or stirrer is recommended. Sufficient heat capacity shall be provided to return the bath to the required temperature within 30 minutes after immersion of the cell.

3.1.4 *Thermometers* — Thermometers conforming to the following requirements shall be used:

	For tests at and up to 121°C[*]	*For tests between* 121°C *and* 170°C[†]
Range	76° to 122°C	90° to 170°C
Graduation	0·2°C	0·2°C
Immersion	65 mm	50 mm
Overall length	340 ± 10 mm	410 ± 10 mm
Stem diameter	5·5 to 8·0 mm	5·5 to 8·0 mm
Bulb shape	Cylindrical	Cylindrical
Bulb length	10 to 16 mm	10 to 20 mm
Bulb diameter	Not greater than stem	Not greater than stem
Length of graduated portion	150 to 190 mm	240 to 280 mm
Distance between bottom of bulb and lowest graduation	115 mm, *Min*	95 to 110 mm
Longer lines at each	1°C and 5°C	1°C
Figured at each	5°C	2°C
Expansion chamber	Required	Required
Top finish	Ring	Ring
Scale error not to exceed	±0·5°C	±0·4°C

3.1.5 *Flowmeter* — A rotameter calibrated to deliver air at the rate of 2·58 ± 0·02 g/min between 16° and 29°C (2 l/min at standard temperature and pressure). It shall be furnished with an air adjustment needle valve as shown in Fig. 1.

4. PROCEDURE

4.1 The test shall be carried out in duplicate.

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[*] Thermometer with the Institute of Petroleum designation IP 10C conforms to these requirements.

[†] Thermometer with the Institute of Petroleum designation IP 59C conforms to these requirements.

4.2 Weigh the clean grease sample cup and hood to the nearest milligram. Remove the hood and fill the cup, avoiding any occlusion of air. Smooth the surface level with the rim of the cup using a straight-edged spatula. Remove any grease which may remain on the rim or threads of the cup. Screw the hood tightly on the cup without disturbing the smoothed grease surface. Weigh the assembly and calculate the net weight of the sample.

4.3 With the cover in place, but without the hood and the sample cup attached, allow the evaporation cell to acquire the temperature of the bath (controlled to ± 0·5°C) at which the test is to be carried out by immersing the cell in it (*see* Fig. 1). Allow the cell to remain in the bath for at least 30 minutes with clean air flowing through the cell at the rate prescribed in 3.1.5 before beginning the test. Then remove the cover, screw the weighed hood and the sample cup into place and replace the cover. Tighten the three knurled cover screws to prevent the air leakage. Pass clean air through the cell for 22 hours ± 5 minutes at the prescribed rate.

4.4 At the end of 22-hour period, remove the sample cup and hood assembly and allow to cool to room temperature. Determine the net weight of the sample to the nearest milligram.

5. CALCULATION AND REPORTING

5.1 Calculate the evaporation loss as follows:

$$\text{Evaporation loss (22-hour drying), percent by weight} = \frac{100\,(S-W)}{S}$$

where

S = initial weight of the sample, and
W = weight of the sample after test.

5.2 Report the geometric mean of the two determinations as:

Evaporation loss at……°C (22-hour drying)

6. PRECISION

6.1 The results of duplicate tests at 121°C shall not differ by more than the following amounts (95 percent probability):

Repeatability	*Reproducibility*
10 percent of the smaller amount	22 percent of the smaller amount

AMENDMENT NO. 1 NOVEMBER 1993
TO
IS 1448 [P : 68] : 1967 METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS

EVAPORATION, LOSS IN GREASES (22-HOUR DRYING)

(*Page* 1, *clause* 1.1) — Add the following after 1.1:

'**1.2** This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.'

(*Page* 1, *clause* 2.1) — Add the following clause after 2.1 and redesignate the subsequent clauses:

'3. SIGNIFICANCE AND USE

This test is used to indicate the degree of volatile matter present in a grease and is used mainly for specification purposes. No correlation with field services has been established.'

(PCD 01)

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